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**ENVIRONMENT, SAFETY & HEALTH
SELF-ASSESSMENT REPORT
FISCAL YEAR 1999**

Environment, Health and Safety Division

**Office of Assessment and Assurance
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Executive Summary

For Fiscal Year 1999, the Laboratory Self-Assessment Program focused on the implementation and effectiveness of Integrated Safety Management (ISM) in division operations. FY99 represents the second year that the division ES&H performance was assessed against criteria utilizing the core work functions and guiding principles of ISM. Additional, for the MESH reviews conducted by the Safety Review Committee (SRC) this year, the lines of inquiry were also aligned with ISM. functions and principles. The Integrated Functional Appraisals (IFAs), the third component of the Lab's Self-Assessment Program, continued with its focus on the technical assessment of division controls of medium and high hazard facilities.

Based on the results of the division self-assessments, the SRC MESH reviews, and the IFAs, overall division ES&H performance were deemed to be excellent to outstanding. Full implementation and effectiveness of ISM were evident for all divisions. Most divisions improved their ISM performance from the previous year. In particular, two divisions that were identified with significant shortcomings last year were rated at the good/excellent performance level this year. The Lab's FY99 ES&H performance rating and comparisons with last year's rating and with the FY99 UCOP and DOE Appendix F ratings are as follows:

FY99 ES&H Performance		Comparisons		
ISM-Based Performance Criteria	Self-Assessment Performance Rating	FY98 Self-Assessment Rating	FY99 UCOP Appendix F Rating	FY99 DOE Appendix F Rating
1. Define the Scope of Work	97.4%	91.7%	95%	
2. Identify & Analyze Hazards	98.5%	95.8%	95%	
3. Control the Hazards	99.0%	91.0%		
4. Perform the Work	87.0%	82.8%	95%	
5. Feed Back and Improvements	94.8%	89.9%	98%	
Overall Performance Rating	93.6%	90.2%	95.8%	

Division accomplishments from this year's ES&H performance include:

- **Robust and active communication of ES&H issues at all organizational levels.** Divisions have involved senior management to clearly communicate roles and responsibilities to their staff; increased the use of electronic communication including the establishment of safety web sites, newsletters, and frequent e-mail bulletins to all staff; and reinvigorate safety committees to involve staff in the planning and management of division ES&H programs.

- **Systematic and documented hazard reviews.** The level of rigor in conducting division hazard reviews has improved significantly since hazard reviews were identified as an area of concern in the FY98 Self-Assessment Report. Following the lead from several divisions who historically have had excellent review processes, most divisions now utilize their own customized hazard/risk checklists and assurance letters to document the hazard reviews for each principal investigator, program manager, and/or division facility.
- **Improved accountability for required ES&H training.** As a result of a comprehensive upgrade of the Lab's ES&H training database, divisions are tracking the training performance of division personnel more closely and following-up on training deficiencies. This year's training performance has improved significantly from last year's level. The overall completion rate for required training has increased from 66.7% in FY98 to 81.3% this year, a performance level deemed to be good/excellent. A particular noteworthy practice is that the Lab Director evaluated the safety performance and the completion of required ES&H training for each of his division directors.
- **ES&H inspections of all work spaces.** Most divisions inspected 100% of their work space either through self-assessment inspections, management walkthroughs, and/or safety coordinator follow-up visits. Divisions also have conducted their annual reviews of work authorizations to ensure that potential new hazards are appropriately identified. The results are that the Lab has experienced few occurrences related to uncontrolled hazards in the workplace.

In spite of the considerable progress made this year in division ES&H performance, the FY99 self-assessment process did identify ES&H issues where improvements are recommended. These issues require institutional rather divisional follow-up. Thus, the Office of Assessment and Assurance will develop the corrective action plan to address these issues. The areas requiring institutional improvements include:

- **Chemical Inventory:** The chronic complaints that the chemical inventory database and supporting barcoding system are of little or no value to researchers continues to be an issue. Although the need to improve the chemical inventory system has been identified by the annual self-assessment reports for the past two years, minimal progress has been made. A Users' Group has met and formulated a strategy to develop a less labor intensive and more valuable information system for users. However, additional development and piloting remain to be done.
- **Line Management and Staff Involvement:** Many divisions rely on their division safety coordinator or executive safety management team to perform the ES&H duties required by the Self-Assessment Performance Criteria. Mid-managers and staff may not be actively involved in division ES&H activities because the safety coordinator or a small management team assume the primary role for division ES&H responsibilities. The Lab needs to re-emphasize to divisions that ES&H responsibilities cannot be delegated away and that true integration of safety into division activities and operations requires the active involvement of line managers and staff.
- **ES&H Performance Evaluations:** Although identified in the FY98 Self-Assessment Report, there has been little progress made in assuring that ES&H performance is considered for guests, visitors and contractors and that the performance evaluations include behavior and attitude towards safety. The merits of this issue require further consideration and should possibly be discussed by a process improvement team.
- **Tracking and Trending of Corrective Actions:** The use of LSAD by divisions to track self-assessment corrective actions is uneven. Divisions that did not use or under utilized LSAD believed that the database was cumbersome and required significant time to perform the data entry. The

LSAD corrective action tracking system needs to be revitalized to encourage usage by the divisions. Having a robust corrective action tracking system is important for the trending and risk analysis performed by the Office of Assessment and Assurance.

- **SRC MESH Reviews:** The Safety Review Committee has not been able to meet the schedule for MESH reviews. Reviews are to be performed triennially for each division. For the past several years, MESH reviews have been re-scheduled for most division. The SRC is being reconstituted with a new chair and new members. The format for MESH review is also being revised to streamline the effort for reviewers and to be further aligned with the ISM principles and functions. For FY 2000, it is hoped that a revised MESH with new SRC reviewers will result in reducing the backlog of required reviews.
- **LBNL/UCB Memorandum of Understanding (MOU):** The Lab and Berkeley Campus MOU requires Lab employees who work on campus (Appendix J space) to utilize campus ES&H services for addressing ES&H issues in their space. Assuring that Lab employees working on campus are adequately trained and protected has been frustrating for divisions because of the restrictions in the MOU. The MOU, agreed to in 1994, needs to be re-worked.

Introduction

The Berkeley Lab's Environment, Safety and Health (ES&H) Self-Assessment Program is a key Laboratory operation to ensure the workplace is safe, hazards are controlled, and the environment is protected. Designed to promote continuous improvement and regulatory compliance, the program is a means to identify the Lab's strengths and weaknesses in the areas of ES&H. The Self-Assessment Program consist of three types of formal appraisal:

Assessment	Type of Review	Frequency	Performed by
Division Self-Assessment	workplace safety	annual	division line management
Integrated Functional Appraisal (IFA)	in-depth ES&H technical	triennial	EH&S personnel
Safety Review Committee MESH	safety management	triennial	peer researchers and staff

Divisions evaluate their operations against ES&H performance criteria and conduct inspections to identify the presence of inadequately controlled or uncontrolled hazards. IFAs serve as independent technical reviews on divisional control of hazards, in particularly medium and high hazard operations. The Safety Review Committee (SRC) conducts peer reviews of division management of ES&H (MESH).

The Office of Assessment and Assurance (OAA) validates the division self-assessment results and evaluates division's management of ES&H against the performance criteria. In its evaluation, OAA also identifies noteworthy practices and ES&H conditions and trends that may warrant Laboratory management action. OAA prepares the annual institutional ES&H Self-Assessment Report for senior Lab management and DOE.

Because the ES&H performance criteria are critical indicators for the management of ES&H by divisions, much of this report focuses on the division self-assessments. The division performance criteria for fiscal year 1999 (October 1, 1998 through September 30, 1999) are based on the five core work functions and seven guiding principles of Integrated Safety Management (ISM). This is the second year that the Lab has utilized the ISM-based criteria. The FY99 criteria (Appendix A) assess division performance against the ISM work functions to: (1) define the scope of work; (2) identify and analyze hazards associated with the work; (3) develop and implement hazard controls; (4) perform the work within controls; and (5) provide feedback and improvements. Integrated into the criteria are expectations that address the division's adherence to the ISM principles. The principles are (1) line management accountability; (2) clear roles and responsibilities; (3) staff competence; (4) balanced priorities; (5) identification of safety standards; (6) requirements and operations authorization; and (7) hazard controls tailored to the work.

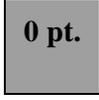
The ES&H performance criteria also are closely aligned with the performance objectives, criteria and measurements of the Berkeley Lab's contract with the U.S. Department of Energy (Contract 98, Appendix F). For this reason, this report provides a comparison of performance ratings between the division self-assessment and Appendix F.

The FY99 ES&H Self-Assessment Report is prepared in accordance with *the LBNL Self-Assessment Program Implementation Plan* (PUB-5344) and satisfies the requirement in Contract 98 for an annual self-assessment summary report.

Division Self-Assessment

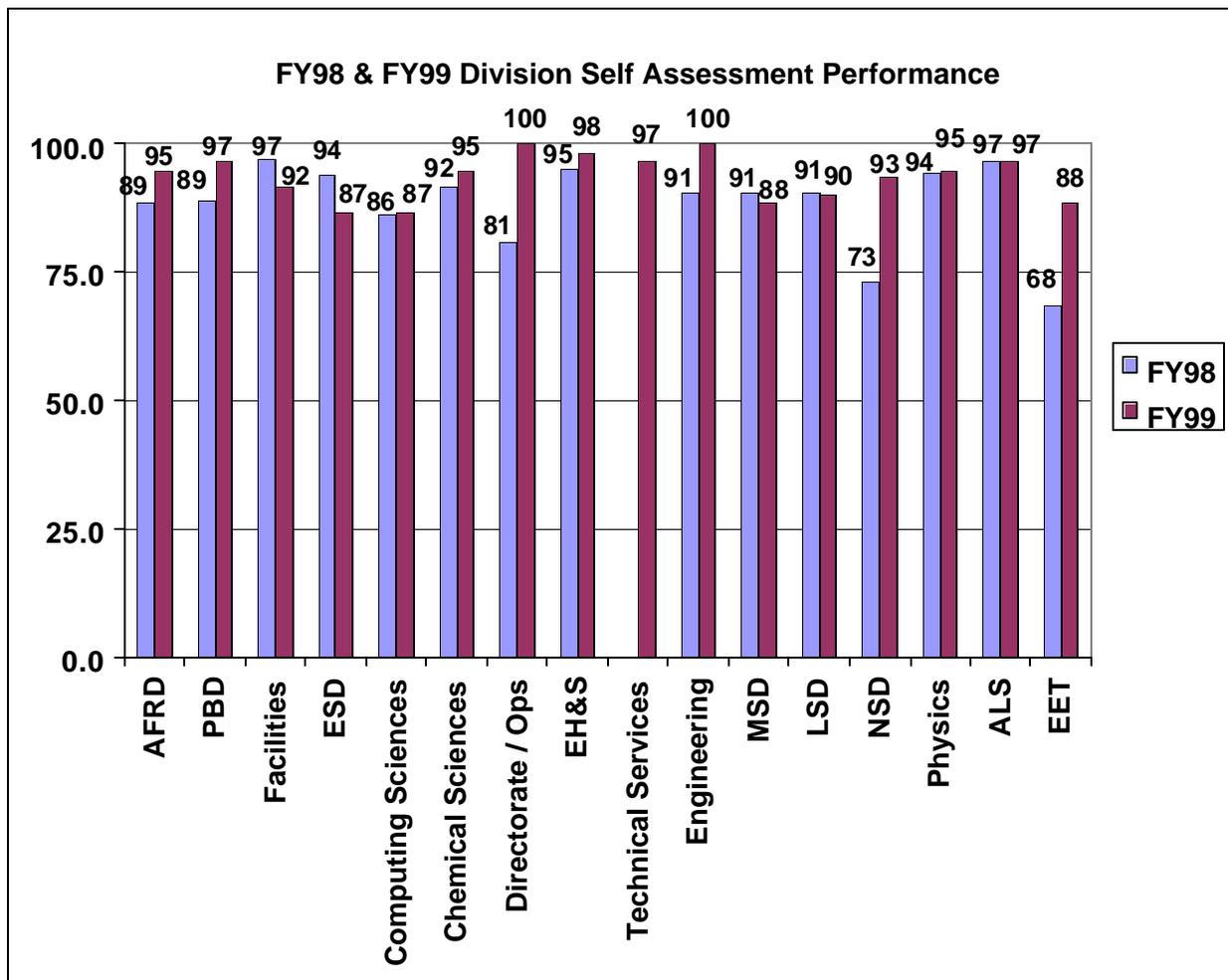
Performance Rating

Rating the division ES&H performance is based on a color-coded system of determining whether each performance criterion and expectation is fully met, partially met, or marginally met. Points are assigned to the three performance grades, and a percent performance is calculated for each criteria and expectation and for overall division performance. The rating system is consistent with the percent performance rating used in Appendix F. The color-code and point system is as follows:

-  **3 pts.** Green indicates that the criterion/expectation is fully met at a >90% performance level, and performance is deemed to be excellent to outstanding. For waste management performance, there are no NCARs, a QA failure rate below the Lab average, and a net waste reduction.
-  **2 pts.** Yellow indicates that the criterion/expectation is partially met at a >50% <90% performance level, and performance is deemed to be marginal to good/excellent. For waste management performance, there are no NCARs, a QA failure rate <5% above the Lab average, and a net waste increase.
-  **1 pt.** Red indicates that the criterion/expectation is marginally met at a <50% performance level, and performance is deemed to be unsatisfactory to marginal. For waste management performance, there are one or more NCARs and/or a QA failure rate >5% above the Lab average.
-  **0 pt.** Not applicable to the division.

Overall Performance Results

With FY99 being the second year of the same ISM-based performance criteria, all Laboratory divisions significantly improved their ES&H performance from the previous year. The divisions had an additional year to assimilate the performance criteria with the embedded ISM functions and principles into their operations and activities. The divisions were also able to focus on key criteria and expectations that were identified as needing improvements in the FY98 ES&H Self-Assessment Report. Areas of improvement included ES&H training, ES&H in P2Rs, chemical inventory database, and identification and control of hazards. The FY99 performance ratings for each division are summarized in Appendix B. Overall improvements in division ES&H performance from the previous year are as follows:



Of particular note are the improvements made by the Nuclear Sciences Division and the Environmental Energy Technology Division. In FY98, both divisions were assessed to have deficiencies in defining the work, implementing controls, training personnel, and providing feedback and improvements. Nuclear Sciences had a performance rating of 73%, and Environmental Energy Technology had a rating of 68.3%. Both divisions have significantly improved their overall rating to 93.3% and 88.3% respectively.

Performance Results by Criteria and Expectation

Laboratory divisions assessed their ES&H performance against each of the FY99 performance criteria and the related expectations. The division self-assessments and the subsequent OAA validation activities resulted in the identification of noteworthy practices and opportunities for improvement. Each division's noteworthy practices and opportunities for improvement are summarized in Appendix C. Overall division performance against each criterion and expectation are described below:

Criterion 1: Define the Scope of Work
Performance Rating: 97.4%

Laboratory divisions integrate ES&H into their research and operations. In defining their scope of work, divisions must demonstrate that (1) roles and responsibilities for ES&H is strongly communicated to all levels of the organization; (2) staff, guests and visitors are held accountable for their ES&H performance; (3) the division safety plan is implemented and regularly updated; and (4) adequate resources and funds are allocated to address ES&H issues.

Criterion 1 Expectations	AFRD	Phys Biosci.	Facilities	ESD	Computing Sciences	Chemical Sciences	Directorate	EH&S	Technical Services	Engr	MSD	LSD	Nuclear Sciences	Physics	ALS	EETD	Expectation Score
evidence of strong ES&H communication (v/n)	yes	yes	yes	yes	yes	part.	yes	yes	yes	yes	yes	yes.	part.	yes	yes	yes	95.8
% ES&H in P2R	100	100	100	100	100	100	100	100	100	100	part.	100	100	100	100	100	97.9
evidence that ES&H plan is being implemented (y/n)	yes	yes	yes	yes	part.	yes	yes	yes	part.	yes	yes	yes	yes	yes	yes	yes	95.8
resources and funds adequate to address ES&H issues (v/n)	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	100
Division Score	100	100	100	100	91.7	91.7	100	100	91.7	100	91.7	100	91.7	100	100	100	97.4

Division Performance:

1. Most divisions have improved or maintained their level of effort to communicate ES&H throughout their organization. The effort includes new safety web pages [EETD, ESD], safety assurance letters and checklists signed off by the principle investigator or manager, and the use of electronic mail for day-to-day communication. Although such effort has generally increased safety awareness and accountability, there are still several divisions [CSD, LSD, NSD] where line managers and staff are not fully involved in integrated safety management.
2. All divisions have established or reconstituted safety or ES&H committees. Some divisions [LSD, Physics, Facilities, MSD, AFRD, ALS] have multiple safety committees. Most divisions have regularly safety committee meetings, from once per month [EH&S, LSD, PBD, Facilities, Physics] to quarterly. Only a few divisions [Computing Sciences, EETD, Engr., NSD] have not been able to sustain a schedule of regular meetings.
3. Many divisions [ESD, LSD, ALS, Computing Sciences, MSD, NSD] have actively utilized their senior managers to communicate safety. Several deputy directors have the management of ES&H as part of their day-to-day responsibility. Several deputy and/or division directors [EH&S, Computing Sciences, Directorate, MSD, ESD, LSD, NSD, ALS] participate in walkthroughs and safety committees. Two divisions [Computing Sciences, Physics] conducted all-hands meeting to discuss ES&H in general and any recent ES&H incidents. One division director [CSD] does not appear to be

fully engaged in the division safety program possibly because he is a faculty member of the Berkeley Campus and is often off-site. He has delegated his safety responsibility to the division deputy.

4. Line management accountability is evident in that safety is addressed in the Personnel Performance Reviews (P2R). A significant noteworthy practice is that the LBNL Lab Director evaluates the safety performance and completion of ES&H training requirements for each of his division directors. However, as identified last year, many divisions are still not fully addressing ES&H performance for guests, visitors, and students who are not subject to the P2R process.
5. Most divisions have conducted their annual review and approval of their division safety plan. The three divisions [Computing Sciences, MSD, TSD] that have not completed their reviews are in the process of obtaining final approval in the next several weeks.
6. All divisions have been able to secure sufficient funds and resources to address their ES&H issues.

Opportunities for Improvement:

1. Management communication of ES&H roles and responsibilities to all division personnel is one of the key processes to effectively integrate ES&H into the scope of work of the division. Several divisions utilize a variety of methods for ES&H communication, including web pages, safety bulletins, level 1 electronic mail, and all-hands safety meetings. Other divisions who are not as active in ES&H communication should model after these more active divisions.
2. Having ES&H as a performance item in the P2R process should continue. However, other methods of holding line managers and staff accountable should be more evident to the division population. Some divisions have instituted rewards or penalties based on the level of compliance to division ES&H policies and procedures. An open system of accountability may influence individuals to be more conscientious in fulfilling their ES&H roles and responsibilities. Such a system can also address students, guests and visitors who are not subject to P2Rs.

Criterion 2: Identify and Analyze Hazards
Performance Rating: 98.5%

Laboratory divisions review their research and operations to identify hazards associated with the work. Divisions must at least annually review their authorized work to identify changes that may affect the safety envelop and conduct an inventory of their chemicals.

GRAPH #2: Criteria 2 performance

Division Performance:

1. The level of rigor for division hazard reviews has improved significantly. Most divisions now utilize checklists and assurance letters to document their reviews. The remaining divisions [Computing Sciences, NSD] are currently developing their hazard review systems. Efforts at the institutional

level to develop a more cohesive hazard review system, including a hazard inventory, is underway for fiscal year 2000.

2. Several divisions [Computing Sciences, Directorate] have identified ergonomics as their primary concern because of the preponderance of computer workstations in their division. However, the evaluation of workstations by trained experts has been slow.
3. All divisions have reviewed division work under formal authorizations (i.e., RWAs, RWPs, AHDs, and SAAs) within the past year.
4. The inventory of chemicals are done by all divisions as prescribed by the EH&S chemical inventory barcoding system. However, many divisions have expressed concerns about the current system being able to provide accurate and useful information. The current system emphasizes barcoding chemical containers. The inventory system is not efficient in tracking usage or movement of the containers. Hence, most divisions do not track the disposition of the chemicals (i.e., when the chemicals are used up or disposed of as chemical waste).

Opportunities for Improvement:

1. Although most divisions are conducting their hazard reviews more comprehensively than in previous years, the analysis and trending of such information on a Lab-wide basis is still difficult because the hazard review systems are so varied. The revision of Chapter 6 of PUB 3000, which includes the development of an institutional hazard review system, should improve the level of consistency and documentation. The new hazard review system, however, should consider the unique and effective hazard reviews now being done by the divisions.
2. The upgrading of the chemical inventory management program still remains undone. After several years of identifying chemical inventory as an ES&H issue requiring improvement, progress has been limited. The Laboratory needs to commit to this issue as a priority project.
3. Poor ergonomics is the most prevalent cause of injuries at the Lab for the past performance period. Several divisions have identified the need to conduct workstation evaluations and to have employees who use computers for more than 4 hours per day be trained. Because of limited resources, only a minority of workstations has been evaluated. Additional training for workstation evaluators is recommended.

Criterion 3: Control the Hazards
Performance Rating: 99%

Laboratory divisions ensure that engineering and administrative controls are in place to mitigate the identified hazards. Engineering controls that require testing and certification (i.e., fume hoods, biosafety cabinets, glove boxes) and/or calibration (i.e., monitoring devices) must be done on a regular basis. Signage that control access and warn about hazards must also be updated for emergency response purposes.

Graph #3: Criteria 3 performance

Division Performance:

1. All divisions track their equipment to determine if they require periodic testing, calibration, and/or servicing. Records show that most equipment have been properly maintained to ensure accuracy and precision in controlling or monitoring hazards. One division office [NSD] was unsure of its inventory of equipment.
2. All divisions review their signage during their self-assessment inspections. Random review of workspaces indicate that signage is updated. Only two divisions [AFRD, Computing Sciences] have not completed their updating.

Opportunities for Improvement:

1. Signage and posting are managed for the most part by divisions. As a result, signage can be ad hoc and arbitrary. Additional institutional guidance and control of signage and posting may provide better consistency and clarity to inform visitors and staff of the hazards and emergency procedures of the posted facility.

Criterion 4: Perform the Work
Performance Rating: 87%

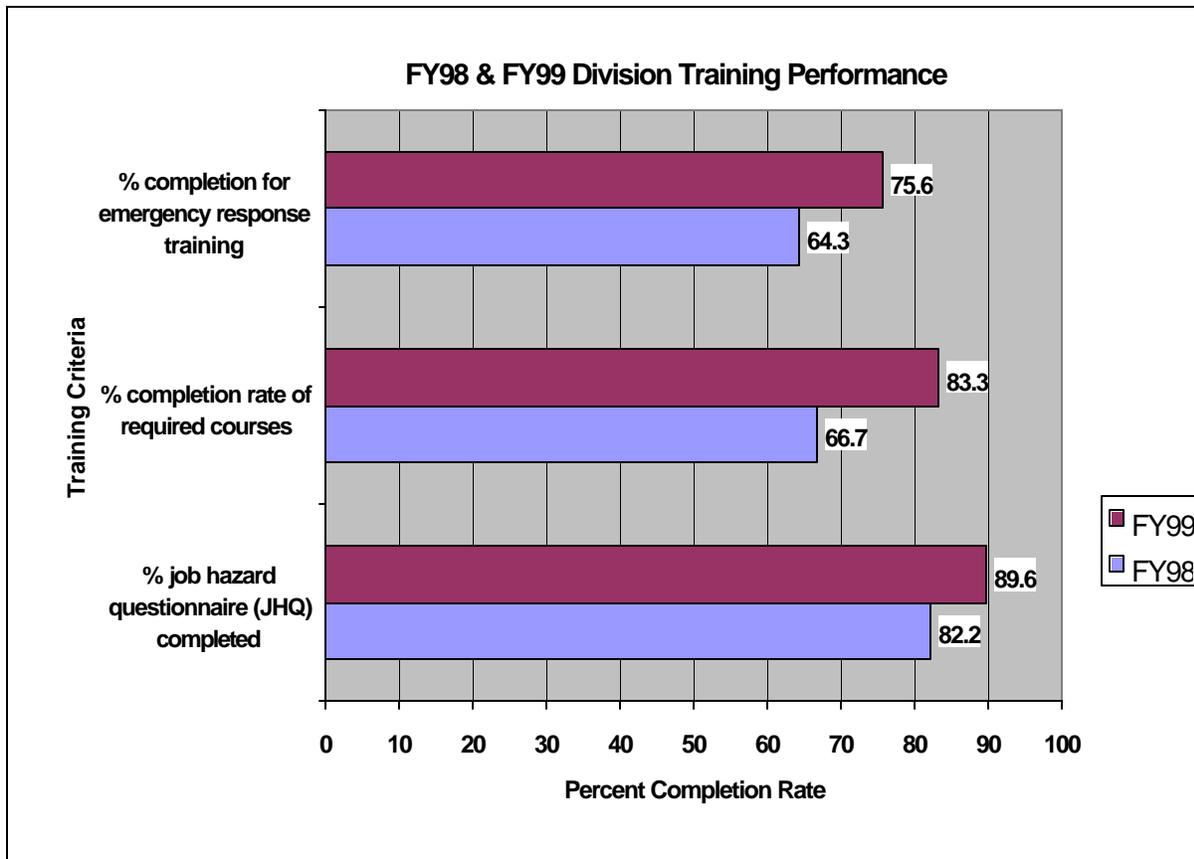
Laboratory divisions perform work within the requirements and conditions of the work authorization. Authorizations can be division self-authorizations, EH&S authorizations (i.e., RWAs, RWPs, SSAs, AHDs), and authorizations issued by regulatory agencies (EBMUD, BAAQMD, DHS). Work must also be performed by trained and proficient staff, guests and visitors.

Graph #4: Criteria 4 performance

Division Performance:

1. Deficiencies in completing required training was the most prevalent shortcoming for all divisions last year. As a result of institutional improvements in the Lab training program during the past year, the completion rates of the Job Hazard Questionnaire, of required training, and of emergency response

training have improved for all divisions. The majority of divisions have completion rates for required training above 90%, with most of the remaining divisions having completion rates above 80%. Three divisions had marginal performance in JHQ completion [NSD] or emergency training [ESD, EETD].



2. Most divisions performed authorized work without major deficiencies. There were only three incidents that were categorized as major deficiencies for RWAs. Two deficiencies occurred in the EH&S Division, and one was in LSD.
3. Division waste management improved significantly over last year. Division compliance with Satellite Accumulation Areas (SAAs) increased from 81% last year to 91% this year. the total number of failed QA samples and NCARs decreased slightly from last year, however, the number of divisions receiving QA exception reports and NCARs increased.. QA exception reports are the mischaracterization of waste as random waste containers are analyzed. NCARs, Non-compliance Activity Reports are violations of waste management policies or procedures that may result in substantial fines and penalties from regulatory agencies. Four divisions [ESD, MSD, LSD, EETD] received one or more NCARs. Five divisions [ESD, MSD, LSD, NSD, EETD] had significant QA failure rates (number of failed samples / number of samples analyzed).
4. Most divisions substantially reduced their hazardous waste from the previous year. Three divisions [Facilities, TSD, MSD] had increases in their waste that were attributable special projects or operations that were not present in the previous year.

Opportunities for Improvement:

1. The EH&S Waste Management Group should look for patterns and work with individual waste generators to increase compliance with waste management policies and procedures. Several division coordinators have indicated that they are not being informed when non-compliance reports are issued, and therefore, they cannot effectively develop and implement corrective actions not only for the non-compliance site but also for other division facilities. The Waste Management Generator Assistance Program should work with each division that incurred a partial or marginal performance rating and assist in developing division-specific corrective actions.
2. The improvement in division performance for meeting training requirements is acknowledged for all divisions. However, sustaining and improving on this year's training performance will be the challenge for the FY00 performance period. Quarterly reports of division compliance with training requirements will allow divisions to respond in a timely manner to any training deficiencies.

Criterion 5: Feedback and Improvement
Performance Rating: 94.8%

To promote feedback and continuous improvement in the workplace, Laboratory divisions conduct inspections and walkthroughs to identify and correct ES&H deficiencies. Division management is also expected to be active in soliciting feedback and involvement from their line managers and staff to improve or sustain the division's safety plan.

Graph: Criteria 5 Performance

Division Performance:

1. All divisions have inspected their work space. The process for inspections varied from division to division. Many divisions rely strongly on their safety coordinators to conduct inspections. Other divisions involved many of their staff to participate. Good examples of line management and staff participation are self-assessments performed in AFRD, Computing Sciences, Directorate, EH&S, MSD, EETD.
2. Some divisions [Facilities, Directorate, EH&S, NSD, Physics] are not using or under utilizing LSAD to track corrective actions for deficiencies discovered during self-assessments. The disuse of LSAD is significant if tracking and trending of deficiencies and corrective actions become difficult or impossible to perform. The Office of Assessment and Assurance performs such tasks through LSAD as part of the UC/DOE management contract (Appendix F).
3. Last year's new initiative to have line managers conduct regular walkthroughs of their work space was emphasized throughout this year. Most divisions have been successful in improving line management involvement as evidenced by the walkthroughs. However, line management

participation can still be improved, particularly in divisions where the safety coordinators assume the primary responsibility to conduct inspections.

4. All divisions have demonstrated their commitment to ES&H with active programs and safety management groups. The division management groups or safety committees meet regularly to address the specific ES&H issues of their organization. Many divisions however do not actively involve division workers to in feedback and improvement.

Opportunities for Improvement

1. Some division safety coordinators and safety management groups manage the division safety programs almost exclusively and thereby limit the involvement of line managers and staff. Although the results are commendable, a basic tenet of Integrated Safety Management is to involve managers and staff in the division ES&H program. Their active participation ensures that ES&H roles and responsibilities are not delegated and that true ES&H integration in the workplace is occurring. Several divisions have required principal investigators and staff to conduct their own documented self-assessments, with the safety coordinator following up.
2. The LSAD corrective action system needs to be used by all divisions. The quarterly aggregate LSAD reports should be re-instituted. OAA will compile the quarterly reports and conduct trending and analysis of the LSAD entries.

Integrated Functional Appraisals (IFAs)

Integrated Functional Appraisals (IFAs) complements the division self-assessment programs by evaluating higher hazard or more complex operations, which demand the ES&H expertise normally beyond the capabilities of the divisions. The appraisal teams are “integrated,” consisting of EH&S subject matter experts as applicable from industrial hygiene, occupational safety, health physics, occupational medicine, fire safety, environmental, and waste management. The IFA teams are to (1) provide an ES&H technical review of division work activities and operations, (2) evaluate the effectiveness of existing controls, and (3) verify and update the Integrated Hazard Appraisal (IHA) database. The database provides an inventory of the physical, chemical, radiological, and environmental hazards in the division workspaces. It is important to keep the IHA database current because it is used to validate the Laboratory’s Work Smart Standards and serves as the basis for each division’s “authorized scope of work.”

For fiscal year 1999, IFAs were conducted in the following divisions:

Life Sciences Division	November 1998
Facilities	May 1999
Nuclear Sciences Division	May 1999
Accelerator and Fusion Research Division	June 1999
Advanced Light Source Division	June 1999
Earth Sciences Division	June 1999

Integrated Functional Appraisal Results

The FY99 IFAs for the six divisions confirmed that the assessed divisions were generally operating within the requirements and conditions of their safety programs. No significant uncontrolled hazards were identified. The medium and high hazard facilities, in particular, were operating within the safety envelopes established by their work authorizations (i.e., AHDs, RWAs, RWPs). Noteworthy practices and opportunities for improvements for each of the assessed divisions are in Appendix D. Common deficiencies noted in all or most of the six divisions are the following:

1. **Seismic Safety:** Tie-downs and bracing were needed for tall and/or valuable research equipment, for storage furniture and equipment, and for office/computer equipment.
2. **Pressure Relief Valves:** Required pressure relief devices are not being fitted or do not meet current standards for compressed gas systems.
3. **Ergonomics:** Numerous computer workstations are not ergonomically correct. All workstations that are used for more than 4 hours per day should be evaluated for adjustments in furniture and equipment, and the operators should be given training in ergonomics.
4. **Chemical Storage:** Proper storage of chemicals with concerns for secondary containment, bar coding for chemical inventory, and compatibility were identified in several laboratories.
5. **Emergency Access:** Access to emergency eyewashes and safety showers and to electrical panels were partially blocked by equipment or supplies in numerous locations.

Common noteworthy practices include:

1. relatively low injury and illness rates for most divisions
2. excellent compliance with satellite accumulation areas
3. effective and proactive safety committees
4. personnel knowledgeable of division operations and ES&H issues

For all divisions, the IFA teams determined that the divisions had successfully implemented an integrated safety management system. A very high level of commitment to safety was evident to the appraisal team.

Safety Review Committee Management of ES&H Reviews SRC MESH

The Safety Review Committee (SRC) is composed of representatives from each of the Laboratory's research and support organizations. Its triennial appraisals of divisional ES&H management are one of the three self-assessment vehicles for collecting information for division and Laboratory management action. Three SRC MESH reviews were scheduled for FY99. The MESH review for the Material Sciences Division was conducted in October 1998. The review for the Computing Sciences Division was completed in May. The third review for the Physics Division has been delayed and is re-scheduled for January 2000.

Material Sciences Division MESH

- 1. Work Planning:** The MSD executive safety committee is active and innovative in developing ES&H systems and procedures that are directly relevant to its staff and activities. The committee has modified the Lab's Job Hazard Questionnaire (JHQ) to fit the division's particular needs, has developed a control "gate" at the Badge Office to distribute ES&H materials to all new MSD staff, implemented the Safety Assurance Statement to improve accountability, publishes regular newsletters and bulletins related to safety, and meets with each research group at least annually to increase safety awareness. Although much work has been done by the committee, the MSD safety committee only meets as needed. The MESH team believes that regular committee meetings are essential for proactive work planning and communication.
- 2. Hazard Identification and Risk Analysis:** MSD has taken a legally significant step in holding line managers accountable for hazard identification and control with the implementation of the Safety Assurance Statement (SAS). 100% of FY99 project proposals have included SAS signed by the principal investigator. The division has also been conscientious and responsible in complying with the Laboratory's requirement for chemical inventory. The division needs to improve its documentation of inspections.
- 3. Establishment of Controls:** MSD has focused on improving its training performance. The division has simplified the JHQ to address only the types of activities found within the division. MSD has also taken a lead role in developing other training options, such as training videos and challenge exams. The division, as with other LBNL organizations, is still struggling with MSD personnel working at the Berkeley Campus (Appendix J space). The Memorandum of Understanding between LBNL and UCB needs to be reworked to provide better assurances that Lab employees working in Appendix J space are adequately trained and protected from workplace hazards.
- 4. Work Performance:** MSD's injury frequency and severity rates are extremely low. For CY 1998, there were no reportable injuries and accidents and no ORPS occurrences. The division has done an exceptional job in correcting ES&H deficiencies discovered during its self-assessment inspections. The division has an LSAD completion rate of 99%. The MESH team however encountered instances where MSD personnel were not aware of and/or did not follow Lab and division safety policies and procedures.
- 5. Feedback and Improvement:** The division is active in improving the tracking of ES&H training, in seeking alternative training options, and in implementing ES&H responsibilities in Appendix J space.

Computing Sciences Directorate MESH

1. **Work Planning:** The Computing Sciences Directorate recently re-organized its safety structure and has a newly crafted safety web site that communicates Computing Sciences' safety policies and procedures to its staff. The new safety organization and the renewed emphasis in ES&H is commendable, however, the challenge for the Directorate is to demonstrate that it can sustain an effective safety program over a period of time.
2. **Hazard Identification and Risk Analysis:** Computing Sciences has appropriately identified ergonomics as its primary concern because of its numerous computer and office workstations. However, other hazards need to be addressed, so the Directorate is developing a hazard review form for its program managers. Inspections of workspaces needs to occur more frequently and with better documentation.
3. **Establishment of Controls:** Ergonomics has been identified by the Directorate as its primary concern, yet only a small percentage of workstations has been evaluated and less than a majority of the staff has received ergonomic training.
4. **Work Performance:** The Directorate has a low injury and accident rate. A significant number of deficiencies noted from the FY98 IFA and the self-assessment LSAD database is not being corrected in a timely manner. The MESH field inspection also encountered instances of poor safety practices or housekeeping.
5. **Feedback and Improvement:** The Directorate has significantly improved its communication to staff. As a result of an accident, the CSD director convened an all-hands safety meeting to discuss the root causes of the accident. The Directorate also has the improved safety web site and a weekly newsletter "In the Loop," that regularly discusses ES&H issues.

ES&H Institutional Improvements

Status of FY98 Self Assessment Corrective Actions

Each year as a result of the annual ES&H self-assessment reports, the Laboratory identifies institutional issues that require management action. The status of the corrective actions for the institutional issues identified in the FY98 ES&H Self-Assessment Report is the following:

1. **ES&H Training:** The EH&S Training Database has been significantly improved during the past year. The interface for tracking training requirements and completion rates are easier to use and more accurate. The feedback from divisions indicate that the sorting and filtering capabilities of the database allows them to manage the training requirements much better. Training completion rates for all divisions are much improved from the previous year.
2. **ES&H in P2R:** Improving the method for evaluating ES&H performance has not been addressed effectively at the institutional level. The FY98 Self-Assessment Report identified that many P2Rs only addressed training requirements and were used just for division employees. The FY98 recommendations were: (1) to revise the P2Rs to assess employee attitudes and behavior toward safety; and (2) to consider ES&H performance of guests, long-term visitors, and contractors. No significant progress has been made on these two issues.
3. **Chemical Inventory Database:** Although divisions have complied with EH&S requirements for chemical inventory, the database is viewed by divisions as not being useful or accurate. In FY99, the Lab has conducted several brainstorming sessions, mapping out a rough strategy for improvements. However, there has been little progress in developing and implementing a revised chemical inventory program. Chemical inventory remains a high priority for management action for fiscal year 2000.
4. **Hazard Identification, Analysis and Control of Hazards:** Documented hazard reviews have significantly improved for all divisions. A project to standardize hazard reviews is being conducted by the EH&S Division. As part of the project, Chapter 6, EH&S Documentation and Approvals, of PUB 3000 is being re-written with a completion date of May 2000. The new hazard review system will also include updating the Integrated Hazard Analysis (IHA) database. The IHA identifies hazards in all Lab spaces.
5. **SRC MESH Reviews:** The FY98 Report recommended that the SRC MESH reviews incorporate the ISM framework of the seven guiding principles and five core work functions. The two MESH reviews in FY99 did incorporate the ISM framework.

FY99 Recommendations for Institutional Improvements

Based on the results of the FY99 Division Self-Assessments, Integrated Functional Appraisals, and the SRC MESH Reviews, the following opportunities for institutional improvement are recommended by the Office of Assessment and Assurance:

- **Chemical Inventory:** The chronic complaints that the chemical inventory database and supporting barcoding system are of little or no value to researchers continues to be an issue. Although the need to improve the chemical inventory system has been identified by the annual self-assessment reports for the past two years, minimal progress has been made. A Users' Group has met and formulated a strategy to develop a less labor intensive and more valuable information system for users. However, additional development and piloting remain to be done.
- **Line Management and Staff Involvement:** Many divisions rely on their division safety coordinator or executive safety management team to perform the ES&H duties required by the Self-Assessment Performance Criteria. Mid-managers and staff are not actively involved in ES&H activities, rather the safety coordinator or a small management team are delegated the ES&H responsibilities. The Lab needs to re-emphasize to divisions that ES&H responsibilities cannot be delegated away and that true integration of safety into division activities and operations requires the active involvement of line managers and staff.
- **ES&H Performance Evaluations:** Although identified in the FY98 Self-Assessment Report, there has been little progress made in assuring that ES&H performance is considered for guests, visitors and contractors and that the performance evaluations include behavior and attitude towards safety. The merits of this issue require further consideration and should possibly be discussed by a process improvement team.
- **Tracking and Trending of Corrective Actions:** The use of LSAD by divisions to track self-assessment corrective actions is uneven. Divisions that did not use or under utilized LSAD believed that the database was cumbersome and required significant time to perform the data entry. The LSAD corrective action tracking system needs to be revitalized to encourage usage by the divisions. Having a robust corrective action tracking system is important for the trending and risk analysis performed by the Office of Assessment and Assurance.
- **SRC MESH Reviews:** The Safety Review Committee has not been able to meet the schedule for MESH reviews. Reviews should be performed triennially for each division. For the past several years, MESH reviews have been re-scheduled for most division. The SRC is being reconstituted with a new chair and new members. The MESH reviews are also being revised to streamline the effort for reviewers and to be further aligned with the ISM principles and functions. For FY 2000, it is hoped that a revised MESH with new SRC reviewers will result in reducing the backlog of reviews already scheduled.
- **LBNL/UCB Memorandum of Understanding (MOU):** The Lab and Berkeley Campus MOU requires Lab employees who work on campus (Appendix J space) to utilize campus ES&H services for addressing ES&H issues in their space. Assuring that Lab employees working on campus are adequately trained and protected has been frustrating for divisions because of the restrictions in the MOU. The MOU, agreed to in 1994, needs to be re-worked.

Appendix A

FY99 Self-Assessment Performance Criteria

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
<p>1. Define Work</p> <ul style="list-style-type: none"> • Division integrates ES & H into work and activities. • L/M consistently review ongoing work and associated hazards to ensure that work is done under the appropriate authorization basis (Self, RWA, AHD, SAD). 	<p>1A. Division Director and L/M communicate ES & H expectations, goals & policies to staff by, but not limited to: [I, II, IV]*</p> <ul style="list-style-type: none"> • Annual all-hands division meeting • Research procedures and protocols include safety notes • Safety as a performance item in staff P2R reviews <p>1B. Division has an approved and validated Safety Plan [I, IV]</p> <p>1C. Adequate funds and resources are allocated for controls of ES&H hazards. [IV]</p>	<p>V1. Is there evidence of on-going Division ES&H activities, such as safety meetings, research safety procedures, staff performance reviews for ES&H conduct?</p> <p>V2. Has the Division implemented its approved Safety Plan?</p> <p>V3. Are the funds and resources allocated appropriate and sufficient for the controls of ES&H hazards?</p>
<p>2. Identify Hazards</p> <ul style="list-style-type: none"> • L/M evaluate work (new and modifications) to identify hazards before work is performed and to establish authorization for performing work safely. • L/M systematically evaluates hazards to mitigate risk posed by work in their area. 	<p>2A. L/M uses Chapter 6 of PUB 3000 or equivalent for evaluating hazards and necessary authorizations for doing work safely. [II, V]</p> <p>2B. Based on the hazards identified, the appropriate authorizations have been issued (note: covers all experiments project including non-AHD activities). [V, VI, VII]</p> <p>2C. Division maintains an inventory of its hazardous chemicals. [VII]</p> <p>2D. Division maintains an inventory of its hazardous activities and operations. [VII]</p>	<p>V4. For all Division projects and programs, have hazard reviews been performed and documented to the Division Office? Do the reviews cover both new work and modification of existing work?</p> <p>V5. What authorizations have been issued for Division work (includes Division, AHDs, RWAs, SSAs, NESHAP, animal/human subjects)? Are the authorizations appropriate for the work being performed? Are the authorizations being reviewed at least annually or earlier when there are new hazards or changes to the work?</p> <p>V6. Does the Division update its chemical inventory at least annually or more frequently if there is a high turnover of chemicals used?</p> <p>V7. Does the Division update its list of hazardous activities and operations at least annually or whenever new hazards or</p>

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
		<p>new/modified hazardous activities are introduced to the Division?</p>
<p>3. Control Hazards</p> <ul style="list-style-type: none"> • Administrative and engineering controls tailored to the hazards have been implemented. 	<p>3A. Staff have been designated and assigned responsibilities to manage safety systems.[I, II]</p> <p>3B. Certification of engineering controls and safety instrumentation are up to date. [V]</p> <p>3C. All authorizations are current. [VI]</p> <p>3D. Signage and postings are appropriate for the work and associated hazards, including emergencies.[VII]</p> <p>3E. Building/Facility Emergency Plan is current and emergency evacuation and assembly routes are posted. [V, VI]</p>	<p>V8. Identify the staff responsible for managing safety systems and programs both at the Division level and at the project/program level.</p> <p>V9. Are fume hoods, biocabinets and glove boxes being certified/checked at least annually or more frequently as required? Are required monitors (toxic gas, stack emission, dosimetry) being calibrated and serviced at least annually or more frequently as required?</p> <p>V10. Are AHDs, RWAs, SSAs, Division, NESHAP, animal/human subjects authorizations being approved/reviewed within 12 months of previous approval/review?</p> <p>V11. Does the Division update its signage and postings at least annually to accurately reflect the work, hazards and emergency information of its projects and programs?</p> <p>V12. Are the Building/Facility Emergency Plans updated at least annually and are the evacuation and assembly routes posted?</p>
<p>4. Perform Work</p> <ul style="list-style-type: none"> • Work is consistently performed within authorization. • Work is conducted in manner that protects the environment. • Safety controls are checked prior to performing work. 	<p>4A. L/M ensures that their work is performed within authorization, safely, and in a manner that protects the environment.</p>	<p>V13. For each applicable authorization (i.e., AHD, RWA, SSA, Division, NESHAP, animal/human subjects), indicate # exceptions or deficiencies identified from authorization inspections and audits?</p> <p>V14. Are the injury and accident rates, occurrence reports, and near misses indicative of unsafe work practices? Are the corrective actions implemented to eliminate unsafe work practices?</p>

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
<ul style="list-style-type: none"> L/M ensures that staff possess proficiency and knowledge commensurate with conducting their assigned work safely. 	<p>4B. Training records document that required training for staff is current. [III]</p> <p>4C. L/M ensure that Building Emergency Team members are fully trained to perform their responsibilities during an emergency. [III]</p> <p>4D. Site and task specific training under authorizations (Self, RWA, SSA, AHD) is current. [VI]</p> <p>4E. System for management of waste streams is matched to handle the categories and quantities of waste produced. [VI, VII]</p> <p>4E. Stewardship: waste minimization performance goals are met, exceeded, or fall short (data provided by EH & S).[IV]</p> <p>4F. Controls called for in all authorizations are in place. Division provides assurances of implementation [V, VI, VII]</p>	<p>V15. % completion rate for Job Hazard Questionnaires (JHQs). V16. Based on JHQs, % completion rate for required courses.</p> <p>V17. % Division emergency team members who have completed all required training.</p> <p>V18. % staff listed in the applicable authorization who have completed all training required by the authorization.</p> <p>V19. % SAAs in full compliance with Laboratory procedures. V20. # exceptions and NCARS reported by Hazardous Waste Management Group.</p> <p>V21. Waste minimization goals: % reduction of mixed-waste volume generated % reduction of hazardous waste volume generated % reduction of radioactive waste volume generated % reduction of sanitary waste volume generated</p> <p>V22. Are authorization exceptions and deficiencies reported to the Division Office? Does the Division Office validates that corrective actions for the exceptions and deficiencies are implemented in a timely manner? (see also V13).</p>
<p>5. Feedback and Improvement</p> <ul style="list-style-type: none"> L/M actively participates in corrective action planning and ensures that plans are effectively executed. 	<p>5A. To ensure hazards are mitigated, L/M & staff do [I, II]:</p> <ul style="list-style-type: none"> Walk Throughs (No formal data needed. Response will be verified during OAA validation) Participate in S/A. (Document S/A team membership) <p>5B. Division has system for L/M to track corrective actions including institutional issues. [I]</p>	<p>V23. % inspections performed in accordance with Division scope and schedule.</p> <p>V24. Identify the personnel who participate in self-assessment. Are they appropriately trained and qualified to conduct ES&H self-assessments?</p> <p>V25. Is there evidence that walkthroughs are occurring regularly in Division workspaces (verified from staff interviews by OAA)?</p> <p>V26. % completion rates for Levels 1, 2, and 3 LSAD-recorded deficiencies, respectively.</p>

PERFORMANCE CRITERIA	EXPECTATIONS	VALIDATION
	5C. Division communicates to all staff lessons learned from ES&H incidents and occurrences. [I, II] 5D. Divisional S/A and Line Management walk throughs are based on work and associated hazards and on the safety [IV] 5E. Division ES&H committee reviews ES&H data and reports (e.g., lessons learned, SAARs, incident reports, EH&S monitoring reports, Appendix F performance measures, etc.) and institutes appropriate mitigation measures. [I, II, VII]	V27. What evidence is there that ES&H lessons learned, trends and root causes are being routinely communicated to all staff? See V23 V28. Do the committee minutes reflect the regular review of ES&H data and reports and the implementation of appropriate mitigation measures?
NOTEWORTHY PRACTICES	NP1: Safety is an agenda item in research meetings. NP2: Describe incentive program for recognizing contributions to ES & H program. NP3: Peer reviews by and benchmarking with work groups with comparable challenges are conducted with the aim of enhancing the S/A program and improving safety and research productivity.	

*ISMS principles are referenced to the corresponding expectations:

- I. Line Management Accountability
- II. Clear Roles & Responsibilities
- III. Competence Commensurate with Responsibilities
- IV. Balanced Priorities
- V. Identification of Safety Standards
- VI. Requirements and Operations Authorization
- VII. Hazard Controls Tailored to Work Being Performed

Appendix B

FY99 Division Self-Assessment Performance Ratings

Rating the division ES&H performance is based on a color-coded system of determining whether each performance criterion and expectation is fully met, partially met, or marginally met. Points are assigned to the three performance grades, and a percent performance is calculated for each criteria and expectation and for overall division performance. The color-code and point system is as follows:

- 3 pts** Green indicates that the criterion/expectation is fully met at a >90% performance level, and performance is deemed to be excellent to outstanding. For waste management performance, there are no NCARs, a QA failure rate below the Lab average, and a net waste reduction.
- 2 pts.** Yellow indicates that the criterion/expectation is partially met at a >50% <90% performance level, and performance is deemed to be marginal to good/excellent. For waste management performance, there are no NCARs, a QA failure rate <5% above the Lab average, and a net waste increase.
- 1 pt.** Red indicates that the criterion/expectation is marginally met at a <50% performance level, and performance is deemed to be unsatisfactory to marginal. For waste management performance, there are one or more NCARs and/or a QA failure rate >5% above the Lab average.
- 0 pt.** Not applicable to the division.

Appendix C

FY99 Division Self-Assessment

Noteworthy Practices and Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Accelerator and Fusion Research	<ul style="list-style-type: none"> • The division has a well entrenched infrastructure to ensure effective integration of ES&H into its work activities. AFRD has in place the ES&H/QA Operations Committee, the ES&H/QA Committee, and the QUEST inspection program. • All division personnel participate in the ES&H self-assessment through assignments to QUEST teams for their program. • Division compliance with ES&H training requirements is exemplary – over 90% completion rates for required courses, including courses for emergency team members. • The division's waste minimization efforts are exemplary. 	<ul style="list-style-type: none"> • Only 50% of division workspace were inspected by the QUEST teams. QUEST inspections, the backbone of the division's self-assessment, is down from previous years (note: the division safety coordinator conducted her own inspections to ensure 100% inspection of its workspace). • Although an improvement from FY98, AFRD's compliance rate for satellite accumulation areas (SAA) is at 80%. • The correction rate for Level 3 LSAD deficiencies is at an extremely low rate of 30%. Correction of these low level hazards needs to be done in a more timely manner.
Advanced Light Source	<ul style="list-style-type: none"> • The division uses multiple methods to ensure that ES&H is communicated to all personnel. The ES&H/QA Committee and QUEST teams discuss safety issues on the divisional and programmatic levels. ES&H is an agenda item at the annual all-hands meeting, and the division director sends out an annual safety memo. • All division personnel participate in the ES&H self-assessment through assignments to QUEST teams for their program. The division safety coordinator also conducts her own inspection of all workspace at least 	<ul style="list-style-type: none"> • The correction rate for Level 3 LSAD deficiencies is at 70%. Correction of these low level hazards needs to be done in a more timely manner.

Division	Noteworthy Practices	Opportunities for Improvement
	<p>annually.</p> <ul style="list-style-type: none"> • The division performs work within the conditions and requirements of its work authorizations. The division has no occurrences, QA exception reports, NCARs, SAA non-compliances, or major RWA deficiencies. • Division compliance with ES&H training requirements are exemplary – over 90% completion rates for required courses. • The division’s waste minimization efforts are exemplary. 	
Chemical Sciences	<ul style="list-style-type: none"> • The division has weekly research meetings where safety is a standing agenda item. • The division require all principal investigators to attend an annual safety meeting. 	<ul style="list-style-type: none"> • CSD staff working on the Berkeley Campus are not fully aware or informed of Lab ES&H issues. This includes the division director who is on the UCB faculty and professes to be not fully knowledgeable of the CSD safety program. The division director apparently delegates safety responsibilities to the other CSD staff. • 100% of space for which CSD is directly responsible are inspected by a team of experts. However, workers and principal investigators are not actively involved in their self-assessments.
Computing Sciences	<ul style="list-style-type: none"> • The division has focused on improved communication and involvement of division personnel to address their ES&H issues. In the past year, the division has had stand-down safety meetings, a reconstituted safety committee, and an improved safety web site. • The division is beginning to conduct their self-assessments more formally with inspection checklists and LSAD corrective action tracking. 	<ul style="list-style-type: none"> • Although the division has focused on ergonomic concerns, the number of workstations evaluated and the number of employees trained for ergonomics is still low. • The division needs to conduct hazard reviews that consider other hazards besides repetitive motion injuries. Hazards such as electrical and seismic should be part of its hazard reviews. • Required training for emergency team members is at 78%.

Division	Noteworthy Practices	Opportunities for Improvement
		<ul style="list-style-type: none"> The correction rate for Level 3 LSAD deficiencies is at 76%. Correction of these low level hazards needs to be done in a more timely manner.
Directorate / Ops	<ul style="list-style-type: none"> The Directorate has organized its ES&H program so each unit or department has a designated safety representative who is tasked to meet the ES&H performance criteria. The Deputy Lab Director, Operations, chairs the safety committee. Such participation demonstrates senior management commitment to ES&H. The implementation of a Directorate Safety Committee and the dissemination of information from the representatives back to their respective organizations reinforced by line management appears to be effective. There has been a concerted effort to conduct workstation evaluations to address the Directorate/Ops primary hazard, repetitive motion injuries. Compliance with ES&H training requirements is exemplary – over 90% completion rates for required courses, including courses for emergency team members. 	<ul style="list-style-type: none"> While the Directorate has made improvements in conducting workstation evaluations, this should remain a continual area of focus for the next year.
Earth Sciences	<ul style="list-style-type: none"> Senior management, through the division deputy director, takes an active role in its day-to-day ES&H activities. The division uses an ESD ES&H questionnaire to identify new or modified hazards. The division has developed 7 Off-Site Safety and Environmental Protection Plans (OSSEP) to handle its off-site ES&H issues. 	<ul style="list-style-type: none"> The division should assume line management responsibility to ensure the updating of its building emergency plans and evacuation routes. The division's waste management incurred 1 NCAR, 8.33% QA failure rate, and a 93% Satellite Accumulation Area (SAA) compliance rate. Documentation of the self-assessment inspections is uneven.

Division	Noteworthy Practices	Opportunities for Improvement
		<ul style="list-style-type: none"> • Management walkthroughs are not fully implemented. • Corrective actions for Hazard Level 3 LSADs are not done in a timely manner (79% completion rate).
Engineering	<ul style="list-style-type: none"> • Safety is a standing agenda item for its weekly Department Head meetings. • The division posts its ES&H performance graphically in division buildings, allowing its staff to understand the goals and performance of the division's ES&H program. • Division compliance with ES&H training requirements is exemplary – over 90% completion rates for required courses, including courses for emergency team members. • The division's waste minimization efforts are exemplary. 	<ul style="list-style-type: none"> • The division safety committee meetings are not occurring at the frequency specified in the committee charter.
Environmental Energy Technologies	<ul style="list-style-type: none"> • The division has significantly improved its commitment to safety from the previous year. EETD has allocated more resources to its ES&H program, reconstituted its safety committee, and developed an intranet site for its safety program. • The division conducts a documented hazard review with its Project Safety Review system for new and modified research proposals. • Each principal investigator is required to conduct its own self-assessment, with an independent follow-up by the division safety coordinator. The system allows for line management and staff involvement in ES&H. • The division utilizes multiple databases to scrupulously track its 	<ul style="list-style-type: none"> • The division's waste management incurred 2 NCARs, 8% QA failure rate, and a 85% Satellite Accumulation Area (SAA) compliance rate. • Although required ES&H training has improved significantly from last year, the completion rate is still at 76% for required training, and only 44% for training for emergency team members. • The division safety committee has met only once this performance period.

Division	Noteworthy Practices	Opportunities for Improvement
	ES&H performance.	
Environment Health and Safety	<ul style="list-style-type: none"> • ES&H communication is strong within the division. The division has monthly safety committee meetings, quarterly all-hands meetings where ES&H is a standing agenda item, and ES&H as a performance item for every P2R in the division. • Division compliance with ES&H training requirements is exemplary – over 90% completion rates for required courses, including courses for emergency team members. • The division’s waste management is exemplary – no NCARs, no QA failures, and 100% SAA compliance. • Management walkthroughs, including monthly walkthroughs by the division director, are performed consistently throughout the year. 	<ul style="list-style-type: none"> • The division incurred 2 major deficiencies in its authorized RWA work.
Facilities	<ul style="list-style-type: none"> • Facilities senior management has provided significant resources to support a full time safety engineer and the Behavior Based Accident Prevention (BBAP) Program. • The department has established during this past year a safety committee which meets once per month. Safety issues raised at the committee meetings are passed through line management down to the workers through group meetings or tailgate meetings. • The department considers the safety performance of its contractors when awarding contracts. • The Facilities Safety Engineer meets weekly with the small project coordinator to assist in hazard identification. 	<ul style="list-style-type: none"> • The training completion rates for required training and emergency response training are at a relatively low 71% and 63% respectively. • The department’s waste management incurred a 85% compliance rate for Satellite Accumulation Areas (SAAs) and a waste increase in its waste minimization. • Line managers are not conducting their own safety walkthroughs on a regular basis.

Division	Noteworthy Practices	Opportunities for Improvement
Life Sciences	<ul style="list-style-type: none"> • The LSD Safety Committee continues to provide a strong safety infrastructure at the working level. • The division director meets directly with DOE representatives on waste minimization opportunities and participates in the renewal of the RWA for her research program. • By tracking the Chemical Management System User Report, the division safety coordinator gains insight into changes in the potential for chemical hazards. If warranted, he contacts staff and PIs to alert them to the potential increased risk. • The division's waste minimization efforts are exemplary. 	<ul style="list-style-type: none"> • Roles and responsibility for safety appear to be unclear to several department heads. Some department heads were unfamiliar with the division's self-assessment program and did not address safety in the P2Rs. • The training completion rates for required training and emergency response training are at a relatively low 78% and 70% respectively. • Line management and worker involvement in hazard identification and walkthroughs are minimal. Most of these activities are conducted solely by the division safety coordinator. Although the coordinator does an excellent job, more active participation by line management and staff is essential to be consistent with the principles of ISM. • The division's waste management incurred 1 NCAR and a 5.5% QA failure rate.
Material Sciences	<ul style="list-style-type: none"> • MSD has a mature safety structure designed to receive input from each research group and to distribute information to all staff. The division has an Executive Board, Division Safety Committee, and Group Safety Representatives with their own meetings. • The Division Executive Board meets every other month and safety is always on the agenda. Topics have included incentives / penalties to improve compliance with required training and corrective actions based on the EH&S quarterly performance reports. • ES&H information is made available to division personnel through their safety web site, the MSD Safety Bulletin, and the MSD Accident Reporter. 	<ul style="list-style-type: none"> • Not all principal investigators have completed their Project Hazard Questionnaire. For the PIs who have filled in their questionnaire, the process is effective in stimulating pre-work planning. • The division's waste management incurred 3 NCARs, 13.8% QA failure rate, and a net increase in waste production. • 100% of workspace was inspected by a team of experts. Line management and worker involvement in the inspections are minimal. Although the Executive Board does an excellent in managing ES&H, more active participation by line management and staff is essential to be consistent with the principles of ISM.

Division	Noteworthy Practices	Opportunities for Improvement
	<p>Reporter.</p> <ul style="list-style-type: none"> • All projects require a Safety Assurance Statement signed by the principal investigator and with an accompanied completed Project Hazard Questionnaire. • As confirmed by the MSD self-assessment, the IFA, and the MESH review, division has generally worked within the conditions and requirements of its work authorizations. • MSD has an active and aggressive lessons learned program derived from information within the division, across the Lab, and from outside sources. 	
<p>Nuclear Sciences</p>	<ul style="list-style-type: none"> • The 88" Cyclotron ES&H Committee meets regularly and also performs quarterly walkthroughs on specific ES&H topics. • The division has significantly improved its training performance from the previous year. Division compliance with ES&H training requirements has improved to over 90% completion rates for required courses, including courses for emergency team members. • The division's waste minimization efforts are exemplary. 	<ul style="list-style-type: none"> • Although groups within the division are represented in the 88" Cyclotron ES&H Committee, it is not clear their issues are addressed. The focus appears to be primarily on issues related to the 88" Cyclotron. • Hazard reviews and follow-up actions for the division's authorizations (AHDs, RWAs, and SSAs) are not done in a timely manner. • The division is not assuring that its equipment and monitoring devices are being tested, serviced and calibrated on a regular basis. • The division is not assuring that their building emergency plans and evacuation routes are up-to-date. • The division's waste management has a 5.08% QA failure rate. • Inspection of division space outside of the 88" Cyclotron is uneven and not well documented. • LSAD corrective action tracking is

Division	Noteworthy Practices	Opportunities for Improvement
		<p>under utilized by the division.</p> <ul style="list-style-type: none"> • There is no strong evidence that line management and staff are active participants of self-assessment.
<p>Physical Biosciences</p>	<ul style="list-style-type: none"> • The PBD Safety Committee meets on a monthly basis. The division, through its safety management group, has implemented a well-documented system of disseminating safety information and tracking safety activities to all employees, guests and visitors. • Through the safety management group, line managers within the division are much involved in integrating ES&H into their work activities. • The division safety coordinator meets with principal investigators in Appendix J space (UCB) to reinforce the PI's role and responsibility for ES&H regardless of the fact that they are technically under the purview of the UC campus. • Hazard reviews are continually identified, assessed and tracked through the safety questionnaire in the "Black Book," self-assessment checklists, and the annual review of formal authorizations. • The division has an effective process for tracking chemicals (i.e., chemical inventory). The division has been systematic in bar-coding all incoming and outgoing chemicals. • The division utilizes a log to manage the testing, calibration, and servicing of its equipment and monitoring devices. • The division's waste minimization 	

Division	Noteworthy Practices	Opportunities for Improvement
	<p>efforts are exemplary.</p> <ul style="list-style-type: none"> • The division utilizes 76% of its staff to participate in self-assessment activities. 100% of workspace has been inspected. • The division made a concerted effort to improve seismic safety, allocating \$6,600 of its funds to correct deficiencies. 	
Physics	<ul style="list-style-type: none"> • Physics continues its practice of holding annual and mandatory ES&H all-hands meetings. In addition, the ES&H Committee meets monthly, Group Leader and Technical Group meetings have safety as a regular agenda item, and the division safety coordinator meets with the division director weekly. • The division was one of the first divisions to utilize the Project Safety Review Questionnaire, which all principal investigators must complete. The questionnaire is effective in identifying new hazards. • The division has no authorization deficiencies. They have a strong program for managing waste, as evidenced by a 100% SAA compliance rate, no NCARs or QA failures, and a significant reduction in hazardous waste. • The safety coordinator and division director conducts management walkthroughs on a quarterly basis. 	<ul style="list-style-type: none"> • Chemical inventory is only partially done, only in the high hazard work areas. The inventory only bar-codes incoming chemical; consumed chemicals have not been deleted. • Required training for emergency team members is only partially completed. • LSAD corrective action tracking is under utilized by the division.
Technical Services	<ul style="list-style-type: none"> • TSD has in place a system to identify and update workplace hazards through the formal authorization process and by inspecting space during its self-assessment. • TSD has implemented an improved system to review accidents resulting in 	<ul style="list-style-type: none"> • The department's ISM Plan has not been fully approved by Lab management. • The department incurred an increase of hazardous waste from the previous year.

Division	Noteworthy Practices	Opportunities for Improvement
	<p>system to review accidents resulting in the Supervisor's Accident Analysis Reports (SAARs) and involving the entire line management chain. This is an attempt to reduce the TRC and LWC rates in the department.</p> <ul style="list-style-type: none">• Department compliance with ES&H training requirements is exemplary – over 90% completion rates for required courses, including courses for emergency team members.• The department has a 99% completion rate for LSAD corrective actions.• Lessons learned and near misses are shared among the shop groups through safety meetings.	

Appendix D

FY99 Integrated Functional Appraisal Noteworthy Practices & Opportunities for Improvement

Division	Noteworthy Practices	Opportunities for Improvement
Life Sciences	<ul style="list-style-type: none"> • The division has low injury and illness rates, for which the division is to be commended. • The division has a high compliance rate for satellite accumulation areas and an outstanding waste minimization program. • People interviewed appear knowledgeable of operations and ES&H issues. • The division has an effective and proactive safety committee, which meets regularly and focuses on ES&H issues that affect the division. 	<ul style="list-style-type: none"> • Seismic – Seismic tie-down for tall and/or valuable equipment (i.e., freezers and refrigerators) needs an evaluation to determine effectiveness and/or enhanced restraint. • It was observed that the required pressure relief devices for a large number of originally installed compressed gas systems are not adequate to meet current standards. • Numerous computer workstations are not ergonomically correct. Suggest that requests for workstation evaluations be made for employees using computers more than 4 hours/day. • Housekeeping, posting and labeling of freezers and refrigerators, access to eyewashes/safety showers and electrical panels, and chemical storage in some areas need line management attention. • All hazards rated as moderate level of concerns identified in the 1996 IHA have been thoroughly evaluated and reclassified from moderate to low level of concern to more accurately reflect the risk exposures encountered in those areas.
Facilities	<ul style="list-style-type: none"> • The Behavior-Based Accident Prevention Program (BBAP) has been successfully implemented, for which the Facilities Department is to be commended. The injury and illness rate has been steadily moving 	<ul style="list-style-type: none"> • Seismic issues – Seismic concerns related to storage procedures in warehouse environments. It was observed in Building 69 and 903 that several pallets were stored on upper shelves of storage racks without

Division	Noteworthy Practices	Opportunities for Improvement
	<p>downward as a result of line management support and employee commitment.</p> <ul style="list-style-type: none"> • An exemplary cross-shop ES&H inspection program has been established and an audit is conducted on a quarterly basis. • Integrated Safety Management core functions (scope of work, hazard analysis and control) have been fully incorporated in all job orders issued by the Work Request Center. Work is in progress to integrate this information into the Facilities Maximo database. • A standardized vehicle maintenance checklist including CHP requirements have been developed. This initiative will ensure LBNL-owned vehicles receive consistent preventative maintenance from offsite contractors. • Facilities is working to produce an on-line photo catalog that details all aspects of the rigging equipment inspection program. • Facilities is continually upgrading the inventory of fall protection equipment available to the department, contractors, and sub-contractors. • The department informs and educates its personnel regarding operations and ES&H issues. • The department maintains effective and proactive safety committees for each functional area of facilities. They meet regularly and focus on ES&H issues that affect the department. The department has recently formed a department-wide safety committee to enhance the communication between line management and workers on ES&H 	<p>restraining straps or shrink-wrap. Also pallets of stored goods stacked on top of each other should be limited to two high configurations.</p> <ul style="list-style-type: none"> • Opportunity for improvement exists for crafts and supervisors on minimizing exposure to repetitive motion injuries. • Two or three examples of chemical containers were not equipped with secondary containment. The current rainwater disposal frequency is not meeting the regulatory requirement to maintain sufficient freeboard for rainwater at all transformer locations. • Supervisors are not utilizing fall arrest analysis survey forms (Oper-327 Attach. 1).

Division	Noteworthy Practices	Opportunities for Improvement
	issues.	
Nuclear Sciences	<ul style="list-style-type: none"> • The division is to be commended for its low injury and illness rates. • The division has a high compliance rate for satellite accumulation areas and an outstanding waste minimization program. • The general housekeeping has significantly improved at the 88" Cyclotron and Building 70, Rooms 203 and 209. • NSD personnel who were interviewed demonstrated appropriate knowledge of operations and ES&H issues. • NSD supports an effective and proactive safety committee, which meets regularly and focuses on ES&H issues that affect the division. 	<ul style="list-style-type: none"> • Several electrical safety concerns were identified. Specific items include the need for strain relief for power cords, covers for electrical contacts, replacement of frayed cords, and replacement of flexible cords with permanent wiring. • It was observed that the required pressure relief devices for a helium gas system was needed. • Numerous computer workstations are not ergonomically correct. It is suggested that requests for workstation evaluations be made for all regularly used computers. • Improved access, inspection tags and availability of eyewashes/safety showers is needed in some areas. Additionally, chemical storage in some areas needs line management attention. • Several workspaces contained transite asbestos benchtops. It is recommended that the benchtops be replaced with asbestos free material if no hot work is currently being performed.
AFRD	<ul style="list-style-type: none"> • The division has successfully implemented an integrated safety management system. A very high level of commitment to safety is evident in an inspection such as the IFA. • People interviewed were knowledgeable of operations and ES&H issues. • An exemplary "wall-to-wall" safety walkthrough program has been established and inspections are 	<ul style="list-style-type: none"> • Seismic bracing of file cabinets and lip restraints on shelves is an ongoing issue as the division continues to move staff around. The AFRD Safety Administrator has referred these items to the Work Request Center. • Housekeeping, access to electrical panels and chemical storage in some areas need line management attention. • Completion of the periodic maintenance schedule for older buildings occupied by AFRD

Division	Noteworthy Practices	Opportunities for Improvement
	<p>conducted on a quarterly basis.</p> <ul style="list-style-type: none"> The division's safety committee has two tiers. The ESH/QA Operations Committee comprised of the working level program safety coordinators and the ESH/QA Committee comprised of the program heads and program safety coordinators. These groups meet in intervals of two and four months respectively, and focus on ES&H issues that affect the division. 	<p>personnel would preempt many safety issues from arising (i.e., loose floor tiles).</p>
ALS	<ul style="list-style-type: none"> The division has successfully implemented an integrated safety management system. A very high level of commitment to safety is evident in an inspection such as the IFA. People interviewed were knowledgeable of operations and ES&H issues. The division has effective and proactive safety committees for each functional area of the division. They meet monthly to focus on ES&H issues that affect the division. The division also has a division-wide safety committee which enables ES&H issues to be communicated across the organization. 	<ul style="list-style-type: none"> Seismic bracing of file cabinets and lip restraints on shelves is an ongoing issue as the division continues to move staff around. The ALS ESH Coordinator has referred these items to the Work Request Center. Housekeeping, access to electrical panels and chemical storage in some areas need line management attention.
Earth Sciences	<ul style="list-style-type: none"> ESD is to be commended for its low injury and illness rates. There have been two recordable accidents in the last three years. The division has been very conscientious about resolving circumstance that might lead to minor injuries. The division has made significant efforts with regard to waste minimization. Researchers have eliminated the generation of routine mixed waste streams. Several researchers have engaged in benchtop treatment, which has reduced the 	<ul style="list-style-type: none"> Many of the ESD work spaces inspected by the IFA team contain file cabinets and other tall equipment that are not seismically restrained. It was observed that a large number of installed compressed gas cylinders are not fitted with the required pressure relief valve. Numerous computer workstations are not ergonomically compatible for the assigned worker. Workstation evaluations are recommended for ESD employees using computers for more

Division	Noteworthy Practices	Opportunities for Improvement
	<p>volume of regulated waste. The researchers have also been very cooperative in substituting non-radioactive isotopes for radioactive isotopes and in using non-regulated chemicals in place of regulated chemicals when feasible. ESD collaborated with EH&S in a study to treat problematic waste streams.</p> <ul style="list-style-type: none"> • ESD personnel who were interviewed demonstrated appropriate knowledge of operations and ES&H issues. • The division has had no reportable occurrences during FY99. 	<p>than 4 hours/day.</p> <ul style="list-style-type: none"> • Chemical storage in some areas need line management attention. Several areas contain chemical containers lacking bar codes. It was also noted that in one area incompatible chemicals are stored in the same locker, in another area there is a diethyl ether bottle containing potentially formed peroxides. • There are four cases where shop equipment and machinery is not equipped with the appropriate guards.